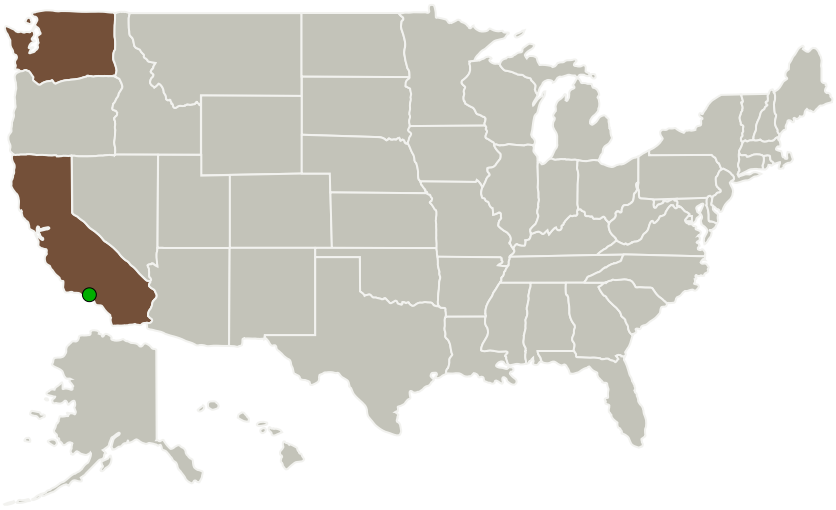
ARACMO: Advanced Regolith Anchoring for Cable-assisted Mobility, Phase I

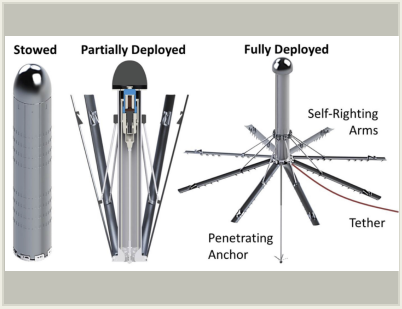
Completed Technology Project (2015 - 2015)

Project Introduction

To enable future robotic exploration systems to have greater mobility capabilities on difficult terrain such as craters, cliffs, gullies, and skylights, Tethers Unlimited proposes to develop the "Advanced Regolith Anchoring for Cable-assisted Mobility" (ARACMO) Anchor. This device can launch hundreds of meters from a rover vehicle, self-right, autonomously anchor, and support high loads through the attached tether. This will enable the rover to rappel, climb, or maneuver over otherwise insurmountable terrain utilizing the stability that a strong anchoring point affords. The proposed technology is part of the ARACMO System (developed in future efforts) which in addition to the aforementioned ARACMO Anchor, may include a launcher, winch, and gimbal. The unique design of the orbital winch accomplishes cable winding and deployment without rotating the spool, thereby minimizing mass and power consumption, while eliminating the need for electrical and optical slip-rings, which are a major risk in dusty environments. The launcher can be incorporated into the design of the which, keeping mass and volume at a minimum. This technology will enable dozens of new applications for planetary exploration.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Tethers Unlimited Inc	Lead Organization	Industry	
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Washington

Project Transitions

June 2015: Project Start

December 2015: Closed out

Closeout Summary: ARACMO: Advanced Regolith Anchoring for Cable-assisted Mobility, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138821)*

Images

Briefing Chart Image
ARACMO: Advanced Regolith Anchoring for Cable-assisted Mobility, Phase I
(https://techport.nasa.gov/image/137289)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Tethers Unlimited Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

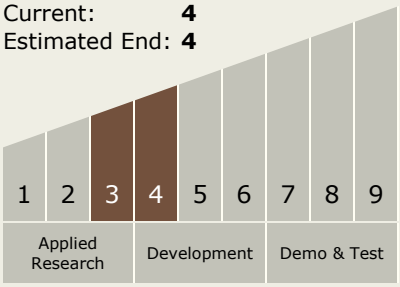
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jeffrey T Slostad

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.3 Small-Body and Microgravity Mobility

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System